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after, powers which no other birds in this part of the world are known to display, and which must be regarded as preparatory to the climbing stage soon to follow." 6. The development of the quill stage of the definitive feathers and the preening instinct on the sixth day results in the unfolding of the larger feathers centripetally from their tips on that day. 7. "Fear is attuned to the climbing stage and not to flight . . . and matures with comparative suddenness on the sixth day, or shortly before the bird is ready to climb." 8. "Parental instincts are as strong in the American cuckoos as in thrushes or in passerine birds generally, and there is more indication of retrogression to parasitism in the former than in the latter." 9. The nests are adequate. 10. "When disturbed in its nest-activities, the black-bill has been known to transfer its eggs to a new nest of its own, an action which strongly suggests the practice of the European cuckoo of carrying its laid egg in the bill to the nest of a nurse." 11. "The American species occasionally 'exchange' eggs, or lay in other birds' nests, and when so doing the black-bill has been known to struggle for possession of the stolen nest. Since similar actions have been repeatedly observed in one or another degree, in numerous species, in which no suspicion of parasitism exists, and in all parts of the world, they must be ascribed, in addition to the reasons given above, not to "stupidity or inadvertance," or "a tendency toward parasitism," but to temporary irregularities in the rhythm of the reproductive cycle.

This paper represents the sort of intensive study which we must more and more be looking toward if our knowledge of the birds is to progress at anywhere near the same rate in the next score of years that it has in the last score. We particularly commend the field studies in the natural environment of the birds instead of laboratory studies under control. The latter has its important place, of course, but the former has been too much replaced by the latter up to the present time.

On the Olfactory Organs and the Sense of Smell in Birds. By R. M. Stron. From the Hull Zoölogical Laboratory, University of Chicago. Reprinted from *The Journal of Morphology*, Vol. 22, No. 3, September, 1911, pp. 619-660. 4 text-figs., 2 pls.

This paper is the result of a series of carefully conducted experiments with ring doves placed in a labyrinth where various odors were employed to test their olfactory sense, supplemented by studies of and dissections of the olfactory lobes and nerves and the nasal chambers, on the part of the author, and an exhaustive

review of the work already done by others. "The author agrees with Edinger ('08a), that a sense of smell should be expected to occur in birds," and "with Turner ('91), that the great reduction of the olfactory organs which has occurred in the higher birds would seem to indicate that the development of keen vision in birds in being accompanied by a degeneration of the olfactory sense which may result in its total loss, eventually." "In the author's judgment, the results of the ring dove experiments warrant the conclusion that the behavior of some birds at least may be affected by olfactory stimuli." The paper thus furnishes a refutation of the contention that birds have no sense of smell, but it leaves open the question as to how large a part this sense plays in the life of the bird.

L. J.